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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/783,007	02/15/2001	Junji Fujino	P103213-00020	1276

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EXAMINER
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YAM, STEPHEN K

ART UNIT	PAPER NUMBER
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2878

DATE MAILED: 01/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/783,007

Applicant(s)

FUJINO, JUNJI

Examiner

Stephen Yam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,5-8 and 11-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,2,5,6 and 11 is/are allowed.
- 6) ☒ Claim(s) 7,8 and 12-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other: \_\_\_\_

### DETAILED ACTION

This action is in response to Amendments and remarks filed on September 30, 2003. Claims 1, 2, 5-8, and 11-15 are currently pending.

#### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 5, and 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Nohira et al. US Patent No. 4,891,519 in view of Matsuda US Patent No. 4,629,882.

Regarding Claim 1, Nohira et al. teach (see Fig. 2) a photosensor-amplifier device comprising a photoelectric conversion element (18) that converts an optical signal into an electric signal (see Col. 3, lines 30-31), a first electrode (output of (16)) connected electrically to the photoelectric conversion element and by which the electric signal is extracted from the photoelectric conversion element, a second electrode (output of (17)) formed on the photoelectric conversion element in close proximity to the first electrode in such a way that the electric signal does not pass through the second electrode (see Col. 3, lines 38-39), an amplifier circuit (23) that has a first input terminal (+ terminal of (21)) and a second input terminal (- terminal of (21)) and that amplifies and then outputs a difference between electric signals fed to the first and second input terminals (see Col. 3, lines 44-47), a first bonding wire (19) that connects the first electrode to the first input terminal, and a second bonding wire (20) having substantially an identical

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length as the first bonding wire (see Fig. 1b and Fig. 2) and laid side-by-side substantially parallel to the first bonding wire (see Fig. 2), the second bonding wire that connects the second electrode to the second input terminal, wherein the first and second bonding wires receive electromagnetic noise in substantially equal degrees (see Col. 4, lines 4-8) so that noise signals induced in the first and second bonding wires are made substantially equal to each other (see Col. 2, lines 25-30 and Col. 4, lines 4-8). Nohira et al. do not teach each of the first electrode, the second electrode, the first input terminal, and the second input terminal arranged in a substantially rectangular shape in plan view. Matsuda et al. teach (see Fig. 4) a photoelectric conversion and amplification device comprising a photoelectric conversion element (20), a first electrode (30a) connected electrically to the photoelectric conversion element and by which the electric signal is extracted from the photoelectric conversion element, a second electrode (30b) formed on the photoelectric conversion element in close proximity to the first electrode in such a way that the electric signal (out of 30a) does not pass through the second electrode (since (30b) outputs a second electric signal), an amplifier circuit (52) (see Col. 6, lines 23-29) with a first input terminal (32a) and a second input terminal (32b) and amplifying and outputting a difference between electric signals fed to the first and second input terminals (see Col. 6, lines 56-67), a first bonding wire (26a) (see Fig. 3a and 3b) connecting the first electrode to the first input terminal and a second bonding wire (26b) having a substantially identical length as and laid substantially parallel to the first bonding wire, connecting the second electrode to the second input terminal, wherein each of the first electrode, the second electrode, the first input terminal, and the second input terminal are arranged in a substantially rectangular shape in plan view (see Fig. 3a). It would have been obvious to one of ordinary skill in the art at the time the invention

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was made to arrange the first electrode, the second electrode, the first input terminal, and the second input terminal arranged in a substantially rectangular shape in plan view as taught by Matsuda et al. in the device of Nohira et al., to provide an optimal surface shape for establishing electrical contact with the bonding wires.

Regarding Claims 5 and 6, Nohira et al. in view of Matsuda et al. teach the device in Claim 1, according to the appropriate paragraph above. Nohira et al. also teach (see Fig. 2) the photoelectric conversion element including a photodiode (13) and a diode (15), with the diode shielded from light so not as to generate photoelectric conversion current, the first electrode is connected electrically to one end of the photodiode (through (16)) and the second electrode is connected to one end of the diode. Nohira et al. do not teach the photodiode and the diode built by joining an N-type semiconductor and a P-type semiconductor together. Matsuda et al. teach the photoelectric conversion element including a photodiode (see Col. 4, lines 28-33) comprised of joining an N-type semiconductor (22) and a P-type semiconductor (24) together and a diode comprised of joining an N-type semiconductor (22) and a P-type semiconductor (26) together and shielded from light (see Col. 5, lines 31-37), and the first electrode is connected electrically to one end of the photodiode and the second electrode is connected to one end of the diode (see Fig. 3b). it would have been obvious to one of ordinary skill in the art at the time the invention was made to build the photodiode and the diode by joining an N-type semiconductor and a P-type semiconductor together as taught by Matsuda et al. in the device of Nohira et al. in view of Matsuda et al., to construct a common layered semiconductor device for converting light to an electrical signal.

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3. Claims 2 and 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Nohira et al. in view of Matsuda et al., further in view of Venkatachalam US Patent No. 5,724,967.

Nohira et al. in view of Matsuda et al. teach the device as taught in Claim 1, according to the appropriate paragraph above. Nohira et al. do not teach identical bias voltages applied to the first and second input terminals. Ven et al. teach (see Fig. 1) a sensor-amplifier device comprising a sensor element (12) and amplifier circuit (18) with a first input terminal (+ terminal) and a second input terminal (- terminal) wherein identical bias voltages (30) are applied to the first and second input terminals. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply identical bias voltages to the first and second input terminals as taught by Sawada et al. in the device of Nohira et al. in view of Matsuda et al., to provide an identical reference voltage from each of the inputs for accurate sensor measurement.

Regarding Claim 11, Nohira et al. teach (see Fig. 1) a photosensor-amplifier device comprising a first section (18) having a photoelectric conversion element (13, 15) that converts an optical signal into an electric signal (see Col. 3, lines 30-31), a first electrode (output of (16)) formed on the first section and connected electrically to the photoelectric conversion element, a second electrode (output of (17)) formed on the first section so as to be located in close proximity to the first electrode (see Fig. 2), a second section having an amplifier circuit (21) for amplifying and outputting a difference between electric signals fed thereto (see Col. 3, lines 44-47), a first input terminal (+ line of (21)) formed on the second section and connected electrically to one input portion (+ terminal of (21)) of the amplifier circuit, a second input terminal (- line of (21)) formed on the second section so as to be located in close proximity to the first input

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terminal (see Fig. 2) and connected electrically to another input portion (+ terminal of (21)) of the amplifier circuit, a first bonding wire (19) connecting the first electrode to the first input terminal and a second bonding wire (20) having substantially an identical length as the first bonding wire and laid substantially parallel thereto, the second bonding wire connecting the second electrode to the second input terminal, wherein the first and second bonding wires receive electromagnetic noise in substantially equal degrees (see Col. 4, lines 4-8) so that noise signals induced in the first and second bonding wires are made substantially equal to each other (see Col. 2, lines 25-30 and Col. 4, lines 4-8). Nohira do not teach the first and second sections as chips, identical bias voltages are applied to the first and second input terminals, or each of the first electrode, the second electrode, the first input terminal, and the second input terminal arranged in a substantially rectangular shape in plan view. Matsuda et al. teach (see Fig. 4) a photosensor-amplifier device comprising a first chip (20) having a photoelectric conversion element (20) that converts an optical signal to an electrical signal (see Col. 5, lines 51-58), a first electrode (30a) formed on the first chip and connected electrically to the photoelectric conversion element, a second electrode (30b) formed on the photoelectric conversion element in close proximity to the first electrode, a second chip (34) containing an amplifier circuit (52) (see Col. 6, lines 23-29) for amplifying and outputting a difference between electric signals fed thereto (see Col. 6, lines 56-67), a first input terminal (32a) formed on the second chip (see Fig. 3b) and connected electrically to one input portion of the amplifier circuit (see Fig. 4), a second input terminal (32b) formed on the second chip (see Fig. 3b) so as to be located in close proximity to the first input terminal (relative to the entire system (see Fig. 4) and connected electrically to another input portion of the amplifier circuit (see Fig. 4), a first bonding wire (26a)

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(see Fig. 3a and 3b) connecting the first electrode to the first input terminal, a second bonding wire (26b) having substantially an identical length as the first bonding wire, connecting the second electrode to the second input terminal, wherein each of the first electrode, the second electrode, the first input terminal, and the second input terminal are arranged in a substantially rectangular shape in plan view (see Fig. 3a). Nohira et al. and Matsuda et al. do not teach identical bias voltages applied to the first and second input terminals. Sawada et al. teach (see Fig. 1) a photosensor-amplifier device comprising a photoelectric conversion element (1,5) and amplifier circuit (600) (see Fig. 3) with a first input terminal ( $V_{in1}$ ) and a second input terminal ( $V_{in2}$ ) wherein identical bias voltages ( $V_{PD}$ ) are applied to the first and second input terminals (through (1, 5) as the voltage passing through a photodiode (1) and a capacitor (5) do not change between each of their two terminals) (see Fig. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the sections as chips and arrange the first electrode, the second electrode, the first input terminal, and the second input terminal arranged in a substantially rectangular shape in plan view as taught by Matsuda et al. and to apply identical bias voltages to the first and second input terminals as taught by Sawada et al. in the device of Nohira et al., to provide easier manufacturing and fabrication of the device and provide an optimal surface shape for establishing electrical contact with the bonding wires, and to provide an identical reference voltage from each of the inputs for accurate sensor measurement.

*Allowable Subject Matter*



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4. Claims 7, 8, and 12-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claims 7, 8, 14, and 15, the invention as claimed, specifically in combination with a first and second conductor pattern formed on the substrate, wherein the first and second electrodes are connected to the first and second input terminals, respectively, through different portions of the first and second bonding wires, respectively, is not disclosed or made obvious by the prior art of record.

Regarding Claims 12 and 13, the invention as claimed, specifically in combination with forming the first electrode by removing a part of the insulating film to make contact with a semiconductor layer and forming the second electrode on the insulating film and leaving it electrically open, is not disclosed or made obvious by the prior art of record.

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 1, 2, 5-8, and 11-15 have been considered but are moot in view of the new ground(s) of rejection.

Regarding Applicant's arguments that the input terminals 32a, 32c of Matsuda et al. are not input terminals of the amplifier circuit 52, Examiner asserts that the input terminals were

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incorrectly referenced in the prior Office Action and should be 32a, 32b, with the first and second electrodes as 30a, 30b and the first and second bonding wires as 26a, 26b. The current rejection above has been corrected accordingly.

### *Conclusion*

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (703)306-3441. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703)308-4852. The fax phone number for the organization where this application or proceeding is assigned is (703)308-7724.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

SY

  
THANH X. LUU  
PATENT EXAMINER